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AN APPLICATION OF MANAGERIAL ACCOUNTING  
TO COST DATA IN A HOSPITAL SERVICE DEPARTMENT

A THESIS

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TO COST DATA IN A HOSPITAL SERVICE DEPARTMENT

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## SUMMARY

This thesis is concerned with increasing the efficiency of a hospital service department manager. The hospital service department manager is confronted with the decision of how and in what manner he should allocate his managerial abilities among the services offered by the department. Therefore, he is confronted with the problem of choosing from among those services the ones in which a "greater return" can be achieved and concentrating his managerial skills upon them.

To solve this problem facing the hospital manager, the opportunity cost concept is utilized. Cost data from the Pharmacy Department at the Holy Family Hospital of Atlanta, Georgia, is used to demonstrate the applicability of this concept. The services are then ranked into three areas. These areas are:

- (1) A services, which represent about 10 per cent of the total number of services and about 75 per cent of the total cost value contributed.
- (2) B services, which represent about 15 per cent of the total number of services and about 15 per cent of the total cost value contributed.
- (3) C services, which represent about 75 per cent of the total number of services and about 15 per cent of the total cost value contributed.

Once the services are ranked, it is argued that by concentrating on the A services, by paying only slight considerations to the B services,

and by neglecting or delegating the C services, a hospital manager can improve his efficiency.

The conclusions reached by the application of the opportunity cost concept to cost data from a hospital department are several:

- (1) This application helps the hospital department manager to recognize those areas in which a "greater return" is possible.
- (2) This application forces the hospital department manager to concentrate in the more productive areas under his management.
- (3) This application makes the hospital department manager aware that there are other factors which influence his decisions besides the opportunity cost concept.
- (4) This application is only a tool to help hospital managers make decisions based on certain economic considerations.
- (5) The need for other managerial accounting practices is demonstrated by the applicability of the opportunity cost concept to the cost data from the Pharmacy Department.

## CHAPTER I

### INTRODUCTION

Most business enterprises have an accounting system; that is, a means of collecting, summarizing, analysing, and reporting, in monetary terms, information about the business. In studying this system, it is useful to consider it as divided into two parts, financial accounting and management accounting, although in practice the two are not neatly separated.

Financial accounting has the primary objective of providing financial information to parties outside the business -- stockholders, bankers, other creditors, and government agencies. The techniques, rules, and conventions according to which financial accounting figures are collected and reported reflect to a considerable extent the requirements of these outside parties.

Individuals responsible for operating a business -- that is, the management -- also need monetary information to aid them in doing their jobs effectively. Although much of this information is the same as that contained in reports prepared for outsiders, management also needs a considerable amount of additional information. The focus of this thesis is within the domain of management accounting; it is concerned with the accounting information that is useful to management, and with the application of the concept of "opportunity cost" to this information.

### History Leading to Problem

As a member of a team working on ways to improve the managerial decision making by providing actual and detailed cost information to the administration and department managers of a hospital, the author observed that there is a scarcity of managerial ability.

As a result of this observation, the question of what cost information was being used by the service department managers to improve their efficiencies arose. Moreover, by efficiency is meant the relation between achievement of objectives and the consumption of resources. This inquiry revealed that they were concerned mainly with supervision of the services rendered, and not with improving their managerial efficiency through adequate use of cost data available. Here then, lies the essence of the problem. Specifically, how can the service department managers be helped to improve their managerial efficiency, through the use of managerial accounting, and more important, through the use of the opportunity cost concept.

### Specific Problem

Managers often make decisions by choosing what they believe to be the best of the alternative courses of action. Problems in this area are therefore called "alternative choice problems."

In many such problems, the decision is made intuitively; that is, there is no systematic attempt to define, measure, and weigh the advantages and disadvantages of each alternative. A person who makes an intuitive decision may do so simply because he is not aware of any other way of making up his mind, or he may do so for the very good reason that

the problem is one in which a systematic attempt to weigh alternatives is either not useful or not possible. No mathematical formula will help to solve the problem in which the attitudes or emotions of the individuals involved are dominant factors. There is similarly, little point in trying to make calculations if the available information is so sketchy or so inaccurate that the results are completely unreliable.

In many other situations, however, it is possible to deduce at least some of the consequences in a more or less systematic manner. Usually, this process involves consideration of accounting data, particularly cost data.

For example, the manager in a hospital service department is confronted with the decision of how and in what manner he should allocate his managerial abilities to the services rendered by his department. Therefore, he is confronted with the problem of choosing from among those services the ones in which a "greater return" can be achieved and concentrating his managerial skills upon them. Subsequently, a problem exists in which he must use cost information available, and the opportunity cost concept in order to arrive at a solution.

#### Specific Objectives

The primary objective of this thesis is to apply the concept of opportunity cost under managerial accounting to cost data, so as to provide a system by which a hospital service department manager can achieve greater efficiency.

Secondary purposes entail a demonstration of the importance of the promulgation of the concept throughout the hospital; the importance

of cost information to department managers and administrators of hospitals; and the importance of managerial accounting to most service organizations.

#### Basic Assumptions

The following basic assumptions are formalized:

- (1) A body of cost information in the Pharmacy Department of Holy Family Hospital is available.
- (2) Managerial time is a scarce resource.
- (3) There is a continuous backlog of unsatisfied demands on the time of most managers.

The first assumption made in the thesis is that a body of cost information is already available. However, if this were not the case, a method to obtain the information can be found in Hiett's proposal (1). Moreover, it should be pointed out that this thesis is a direct outgrowth of Hiett's research. The author intends to use the results (cost information) of this other study, which he helped gather, and to apply them to managerial accounting. This application will help the department head in his decision making process.

Another assumption is that the manager's time is a scarce resource. A wide variety of experts can be cited to support this basic premise. Phillippe (2) has identified the search for executive manpower as U.S. industry's greatest challenge. Furthermore, Drucker (3) has focused his most recent book on the critical need for the efficient use of time by managers.

That there is a continuous backlog of unsatisfied demands on the time of most managers, is the final assumption. The fact that most mana-

gers put in an extremely long work week supports the premise that there is always a backlog of work to be done.

#### Scope and Limitations

This data collection and study were conducted in a service department at the Holy Family Hospital of Atlanta, Georgia. This metropolitan hospital was selected for the following reasons:

- (1) The author was familiar with this hospital, for he had spent over a year in it conducting related work.
- (2) The Holy Family Hospital, a medium size hospital of 125 beds, is representative of a large number of hospitals.

Since the purpose of this thesis is to apply the concepts of managerial accounting to cost data from a hospital service department, the author decided to carry out his investigations on the Pharmacy Department of the Holy Family Hospital. The reason for selecting only one department is to give a concentrated demonstration of the utility and worth of managerial accounting and opportunity cost concept in the improvement of the managing process.

#### Method of Procedure

The procedure used in achieving the stated objective is outlined below:

- (1) Compilation of cost information for the Pharmacy Department.
- (2) Analysis of data through the application of managerial accounting concepts, particularly that of the opportunity cost.
- (c) Statement of the conclusions.



## CHAPTER II

### LITERATURE SEARCH

#### Introduction

The purpose of the literature search is to familiarize the reader with managerial accounting and with the concept of "opportunity cost" or "alternative cost." This chapter also deals with the application of these concepts to hospitals.

Since the functions of managerial accounting will be discussed; it is assumed that the reader is familiar with the conventional subjects of elementary accounting. A summary of a few characteristics of financial accounting, however, will provide a basis for showing important distinctions.

#### History of Accounting

Accounting dates back to 4500 B.C. when there were taxes and mere record keeping. However, Luca Paccioli, an Italian, laid the foundation for modern accounting in 1494 with the writing of a manuscript describing the process of record keeping now called bookkeeping (4). Once the idea of double entry bookkeeping was introduced, it became a basic tool of management.

In the beginning the role of accounting was that of recording contractual obligations, providing an historical review. Directly from this role, accounting took a second function -- reporting by consistent statements the status of the firm at points in time (in the balance sheet), and

the measurement of revenue and expense over periods of time (in the income statement) (5). With the development of the corporation and resulting absentee owners, the need for objectivity and consistency was increased. The auditing function became essential as different financial interests (stockholders, creditors) sought reliable information about the operations of the firm. These parties stressed the accurate and consistent statement of what had happened in the past (6).

As early as the decade of the 1920's, a view of accounting began to include additional functions (7). These, under the heading of managerial accounting, provided tools for the diagnosis of critical problems requiring management attention. Accountants became more interested in aiding managers in planning and controlling. In summary, as Haynes and Massie stated (8): "Accounting became accounting for management in addition to accounting of management."

### Financial Accounting

Financial accounting evolved largely as needs arose and was unaffected by economics. Accounting principles, theory, and conventions were used for reporting the stewardship of management and for providing information to interested groups external to the business unit. The measurement of profits and the valuation of assets and equities were the ultimate interests of these groups. To provide this information, the accountant had to decide arbitrarily on a time period by which to split up the flow of revenue and costs into segments. Haynes and Massie (9), also stated that: "Financial accountants see themselves as neutral observers who report facts as they exist or have existed," and that: "The

financial accountant always attempts to report in a conservative manner -- in a less rather than more favorable light."

Thus, the essence of financial accounting is the double entry method of bookkeeping and internal control.

### History of Managerial Accounting

The purpose of managerial accounting is to communicate information about economic events -- past, present, and future -- to persons who will use the information to plan and control activities, and to choose among alternative courses of action (10).

Managerial accounting or cost accounting is especially capable of serving this purpose, for the scope of its concepts and methodology does not need to be fettered by the superstructure of "generally accepted" accounting principles, customs, and traditions that constrain financial accounting.

The early part of this century witnessed the development of such important managerial accounting concepts as job and process costing, overhead allocation, cost-volume-profit analysis, standard costs, and variance analysis (11). Yet, for many years managerial accounting literature seemed to emphasize the procedural aspects of generating cost data, and the discussion was concerned with the relationship of cost data to financial accounting information. Rarely was the full potential of cost information for analytical purposes explored (12).

In recent years, however, significant and near-revolutionary changes have taken place in the field of managerial accounting. Individuals have become aware of the potential general use of cost data and of

its validity in a multitude of managerial contexts.

### Managerial Accounting

Since accountants report data to many different types of users, it is not surprising that some users have found that they would have preferred a different method of classification or additional information. Recently accountants (13) have been striving to expand their services for the manager. The manager must look to the future; he must have data tailored to his specific needs; he must consider many factors in making a decision; consistency with the past is not of primary concern; he must analyze certain economic costs even though they are not included in the structure provided by the financial accountant.

The managerial accountant can provide this additional information with an analysis which does not necessarily agree precisely with general accounts. The opportunity costs are an important factor in the economist's decisions (14); yet the financial accountant finds the recording of such costs outside the framework of his system. The managerial accountant can help by using conventional accounts as a foundation to which he adds additional information for specific purposes.

The view in present literature is that accounting is a basic tool of management, which should not be considered only a mechanism of recording and reporting past data from a neutral position. This fact is corroborated by the Committee on Managerial Accounting when it stated (15):

Managerial accounting is the application of appropriate techniques and concepts in processing the historical and projected economic data of an entity to assist management in establishing a plan for reasonable economic objectives and in the making of rational decisions with a view toward achieving these objectives....

To summarize, managerial accounting is a tool by which a manager is aided in planning and controlling operations (16). Analysis of past experience is a starting point, but it must be supplemented by looking into the future.

### Cost

Within the scope of the data-recording function of accounting, the term cost almost invariably means historical cost, or actual cost. This is defined by the Committee on Terminology of the American Institute of Certified Public Accountants (17) as follows:

Cost is the amount, measured in money, of cash expended or other property transferred, capital stock issued, services performed, or a liability incurred, in consideration of goods or services received or to be received.

Therefore, cost, as used in this thesis, is the measurable monetary value of goods or services given up in exchange for other goods or services.

### Costs Relevant to Alternative Choices

Business managers are frequently faced with decisions which may be fairly complex in terms of the number of possible choices. They must, for example, choose among alternatives A, B, C, and D, all of which are mutually exclusive. Other decisions may involve simply the alternative of accepting or rejecting a single proposal. Regardless of the degree of complexity of a particular decision, management must obtain all of the relevant information. This information will include, very importantly, cost data (18). It will also include many other facts which cannot be expressed quantitatively, as are cost data. For example, the impact of a

decision upon employee relations is a crucial factor but is not normally subject to quantitative measurement. Thus, it must be kept in mind that, while cost data are important to a decision, they are still only part of the basis for the final decision.

There is a great variety of cost data available. However, not all of these data are likely to be relevant to the alternatives in a specific decision and, hence, not all should be reported to management for decision-making purposes.

### Opportunity Cost Concept

In the last few decades there has been a growing interest in economic analysis in decisions. In a sense managers have always been economists, for they have been concerned with optimizing their objectives with the scarce means at their disposal. However, many management decisions have fallen far short of what might have been achieved with a more careful application of economic concepts (19).

In economic analysis, the word cost most commonly means opportunity cost (20). The opportunity cost of an economic good or service is the maximum amount which that good or service could yield if applied to some other purpose. Hence, opportunity cost is frequently defined as (21); "the revenue foregone in the most advantageous alternative application as a result of employing capital in its present use." Obviously, the concept of opportunity cost is extremely important and useful to management in making decisions.

In essence, the concept of opportunity cost is almost self-explanatory. The cost of any kind of action or decision fundamentally consists

of the opportunities that are sacrificed in taking that action. For example, in using one's cash to finance an undertaking, one is giving up the opportunity to invest this money in stocks and bonds. Another example closer to the topic of this thesis occurs, if the hospital service department manager concentrates his managerial abilities equally among all the services rendered by his department. He is foregoing the opportunity to concentrate his abilities more productively (hence more effectively) in those services which make up the largest portion of the total cost, while delegating the rest of the services to the care of his assistants. Worth noticing is the fact that in the last example the concept of opportunity cost was not associated with the foregoing of a monetary opportunity, but rather, with the foregoing of the opportunity to use the scarce and time-limited managerial abilities more effectively. The author intends to use the second interpretation of opportunity cost in his research.

#### Relation of Cost Data to Decision Making

An important result of accounting is cost information. Moreover, cost information can be classified according to Anthony (22) into three types according to the purpose for which it is used:

- (1) For financial accounting.
- (2) For management control.
- (3) For deciding among alternative courses of action.

In decision making, cost information can be used to estimate the costs and benefits of alternative courses of action and can, therefore, help management reach a conclusion as to which course of action is the best one.

### Managerial Accounting in Hospitals

As recently as the mid 1960's, there was a dearth of published information regarding the application of managerial accounting to hospitals, while the development of managerial accounting in other industries was unfolding rapidly. It seems reasonable to ask the why for this scarcity in the hospital industry. The answer lies in the effects of "traditionalism" and the matter of alleged "uniqueness" of hospitals. In short, these deeply-rooted characteristics of hospitals tend to foster prejudices, biases and other attitudes which, in turn, tend to inhibit and even thwart attempts to improve hospital management (23).

### Hospital Department Management

Recently Hiatt (24) suggested that the manager or head of a hospital department may perform three distinct roles while the department performs one functional role. Referring to the role of the hospital department he stated that (25): "The principal role of a hospital department is that of a producer of services which meet the needs of patients or of other departments in the hospital." Hiatt (26) identified the three roles of the department head as those of "manager," "staff advisor," and "worker." He concluded that the role of "manager" is the main one, for the others are not roles which the department head assumes daily. Therefore, the author intends to look at the hospital department head only in a managerial capacity.

### Conclusions

The purpose of this literature search was to investigate the application of managerial accounting concepts to hospitals. In this process



several concepts and conclusions were alluded to for use in the following chapters. These were:

1. That managerial accounting is useful to the manager as past information which could be projected into the future.
2. That cost is the measurable monetary value of goods and services given up in exchange for other goods and services.
3. That while cost data are important in a decision, it is still only part of the basis for the final decision.
4. That there is a great variety of cost data, and that not all of these data are likely to be relevant to the alternatives in a specific decision.
5. That by opportunity cost the author is concerned with the efficient use of revenue and the efficient use of the scarce and time limited managerial ability.
6. That this research intends to utilize cost information for the purpose of decision making.
7. That there is a dearth of information about the application of managerial accounting and its concepts to hospitals. This lack can be attributed to the effects of "traditionalism" and the matter of alleged "uniqueness" present in hospitals.
8. That the author intends to consider the hospital department head in only a managerial capacity.

### CHAPTER III

#### COMPILATION OF COST DATA

Although the cost data is available, this chapter is concerned with the method used to gather the data, and with an explanation of the price mechanism used. It concludes with a table of the different services offered by the Pharmacy Department at the Holy Family Hospital, and the compilation of the cost data.

The purpose of Hiett's study (27) is to develop practical procedures for instituting effective managerial control systems which generate relevant fiscal information, and convert such data into managerial aids for departmental heads. To achieve such a purpose, he defines a hospital department as: "A business which buys from and sells to other hospital departments." Furthermore, he defines a service as: "The result of a set of activities which may require men, materials, and machines and which is executed in one department for the benefit of another department." The department providing or producing the service can be called the "producer department" and the department using or consuming the service can be called the "consumer department."

The value of the output can be determined through the establishment of "prices" for the goods and services which are produced by a department and either sold to a customer outside the organization or transferred to another department within the organization. With the establishment of prices for the goods and services of each department, it is possible to

determine the "revenue" accruing to each "producer department." To summarize, Hiatt has identified all the services provided by a department and has a "price" associated with each service offered. By so doing, he has made it possible to determine cost data by multiplying the number of units of each service rendered by a predetermined price per unit.

The method of collecting the data is simple, but it depends on the prices associated with each service. Hiatt recognized three broad systems of price-making:

- (1) Market prices or unadministered prices.
- (2) Business controlled prices or privately administered prices.
- (3) Government controlled prices or publicly administered prices.

In the market price system, prices are determined by auction at organized markets or through negotiation between buyer and seller, and prices are influenced by supply and demand. If this system of pricing were adopted by hospital departments, the department heads could negotiate prices for services where such prices were not available from markets outside the hospital. If each hospital department attempts to optimize its position, the producing department could begin with a high price, the consuming department could begin with a low price and, since there are no external sources or markets through which supply and demand could act to force an agreement, each department could maintain its first position and force the hospital administration to establish the final price. Thus the unadministered price system could lead to the publicly administered price system.

In the privately administered price system, prices are established through the action of business groups acting individually or in concert.

Even though the prices are affected by market pressures, the buyer does not enter directly into the pricing process. By using this pricing system in a hospital, each department could establish the prices to be charged for the services produced in the department. Since there would be no external sources of service available to the consumer department, each producer department could exploit its monopolistic position and establish a very high price. Complaints about the high prices could cause the hospital administration to establish prices, thus establishing a publicly administered price system.

In the publicly administered price system, prices are fixed directly or indirectly by the government or governing body. An example of this system is public utility pricing in which the producing company submits cost estimates and suggested prices to a regulatory commission. The commission reviews the proposal and establishes the prices to be charged for the services. With this pricing system in the hospital, each department head would review the cost of producing the services, suggest prices to be charged for the services, and prepare a proposal justifying the prices. The proposal would be reviewed by an administrative commission which would establish the final price.

Hiett suggests that one reason for considering the installation of a publicly administered price system is that procedures have been developed for regulating public utilities (28) and the hospital service department may be considered to be a public utility in relation to the entire hospital. The concepts of public utility economics may then be applied in developing prices for the services produced by the departments of a hospital. Any hospital department provides an indispensable service under

monopoly conditions with the hospital administration regulating, to some extent, the cost and quality of service. For example, the hospital administration grants a monopoly to the pharmacy manager in order to eliminate costly duplication of facilities and in order to achieve decreasing average unit cost as output increases. The business department, dietary department, and other service departments are also operated somewhat as public utilities.

One of the basic concepts of public utility economics which is useful is that of rate regulation. Each public utility prepares a rate case based upon an estimated cost of service and an estimated demand. The cost of the service, also called the revenue requirement, is the sum of:

- (1) Proper operating expenses.
- (2) Depreciation expenses.
- (3) Taxes.
- (4) A reasonable return on the net valuation of the property.

Using the estimated demand for the services and the cost of service, a rate schedule is proposed such that the total income will equal the cost of service. The proposed schedule is submitted to the Public Service Commission for review, adjustment, and approval. These procedures can be adopted almost directly by the hospital administration. Each hospital department head could review cost and production records, estimate future costs and demands for each service, estimate the price per unit which would return the cost of service, and prepare a report justifying the proposed price. A "service pricing worksheet" appears in Appendix A illustrating a method for arriving at a price report. A commission, establish-

ed by the hospital administration, could review the report and establish prices for the goods and services transferred between departments.

#### Cost Data for the Pharmacy Department

Hiett has identified nine major classifications of services with an associated price per service (See Table 1) in his research of the Pharmacy Department. Some services are classified further into categories starting with the alphabet letter "a" and continuing in order down the alphabet until all the categories are exhausted by that classification. The same process will repeat itself whenever a classification of services has one or more categories.

Records for the number of occurrences for each classification and category of services for this department were kept for the months of December, 1967 and January, February, and March 1968 (See Appendix 3). A cumulative table for this period of four months appears in Table 2. In addition to the number of occurrences, the total cost of the service is noted in the table.

Table 1. Services Provided by the Pharmacy Department of Holy Family Hospital

Number	Service	Charge
1.	Provide pharmaceutical information	\$0.31 per request
2.	Prepare and dispense drugs for patients, includes notifying Business Office.	\$0.25 per order
	a. For drugs to be packaged add	\$0.13 per order
	b. For drugs to be compounded add	\$0.30 per order
	c. For emergency service add	\$0.43 per order
	d. For delivery by Pharmacy add	\$0.36 per trip
	e. For regular night and weekend service add	\$6.25 per order
3.	Prepare and dispense drugs and chemicals for use on floor and for floor stock, includes notifying Business Office.	\$0.31 per order
	a. For drugs to be packaged add	\$0.11 per order
	b. For drugs to be compounded add	\$0.35 per order
	c. For emergency service add	\$0.38 per order
	d. For delivery service add	\$0.36 per trip
	e. Check stock	\$0.31 per day
4.	Prepare and dispense drugs to hospital employees, includes notifying Business Office.	\$0.16 per order
	a. For drugs to be packaged add	\$0.27 per order
	b. For drugs to be compounded add	\$0.42 per order
5.	Prepare and add drugs to solutions.	\$0.31 per order
	a. For emergency service add	\$0.31 per order
6.	Provide training	\$11.50 per hour
7.	Issue contrast media	\$1.66 per order
	a. For emergency service add	\$1.60 per order
8.	Prepare monthly reports for Administration.	\$6.60 per report
9.	Other	Open

Table 2. Cumulative Table of Cost Data for the  
Period from December 1967 to March 1968

No. of Serv.	No. of Occurrences	Charge/Occurrence	Total Cost of Service
1	29	\$0.31/request	\$ 8.99
2	23,790	\$0.25/order	5,947.50
a	---	\$0.13/order	----
b	---	\$0.30/order	----
c	596	\$0.43/order	256.28
d	2,100	\$0.36/trip	756.00
e	353	\$0.25/order	2,206.25
3	1,963	\$0.31/order	608.53
a	---	\$0.11/order	----
b	---	\$0.35/order	----
c	---	\$0.38/order	----
d	407	\$0.36/trip	142.52
e	94	\$0.31/order	29.14
4	462	\$0.16/order	73.92
a	460	\$0.27/order	124.20
b	51	\$0.42/order	21.42
5	17	\$0.31/order	5.27
a	---	\$0.31/order	----
6	---	\$11.50/hour	----
7	11	\$1.66/order	
a		\$1.60/order	18.26
8	4	\$6.60/report	26.40
9 other	1	Open	40.00



## CHAPTER IV

### ANALYSIS OF DATA

This chapter contains the analysis of the data developed in the last chapter. To it the concept of opportunity cost is applied; but, before this application, a summary of the data presented in several tables and figures is undertaken. These figures and tables consist of the same data as before, except that they are rearranged in such a manner as to facilitate the analysis. Also, Pareto's law is used in relation to these figures, since the pharmacy cost data supports Pareto's conclusion.

#### Pareto's Law

Pareto's law (29) can be expressed as "the vital few and the trivial many." A reticulation of this phrase shows, that in any situation with sufficient number of items (services in this study), it is possible to rank those items from the most to the least important. Once ranked, usually a very small percentage (10 per cent or less) of the items will be worth a very high percentage of the total value of all items (75 per cent or more). These are the most important items. The least important items receive a very high percentage of the total quantity (75 per cent or more) but are worth only a very small percentage of the total value of all items (10 per cent or less). Between the most and the least important items will be found a small percentage (10 to 20 per cent) with a similar percentage of the total value (10 to 20 per cent).

From the preceding, it is possible to rank all items in which time

is spent, into three areas of importance: A items, B items, and C items. Usually, a small percentage of items will be most important to any job. Therefore, the three areas of importance can be defined as:

- (1) A items represent 10 per cent of the total quantity and 75 per cent of the total value.
- (2) B items represent 15 per cent of the total quantity and 15 per cent of the total value.
- (3) C items represent 75 per cent of the total quantity and 10 per cent of the total value.

In order that a manager may devote his time to obtaining maximum results from his abilities, he must analyze the relationships of the A, B, and C items within his own position. It is the author's intention to identify those items (services) at the Pharmacy Department of the Holy Family Hospital and rank them into the A, B, and C groups. Furthermore, he intends to use the cost data of Chapter III for the purpose of ranking. That is, the different services offered are going to be identified according to the A, B, and C ranking depending on their total cost value of service.

#### Rearrangement of Data

The data from Chapter III is plotted on a graph (the result is depicted as Figure 1). Figure 1 shows the differences of cost value among the array of services.

In Table 3 the data is rearranged in descending order of cost value; starting with the service with the highest cost value (service number 2) and working down to the services with the least or no cost

value (services number: 2a, 2b, 3a, 3b, 3c, 5a, 6, and 7a). In addition to containing the total cost value of each service in descending order of value, Table 3 contains a column labeled "Per Cent of Total Cost Value." This column shows the relation of a particular service to the total cost of all services for the department as a percentage figure. The last column in this table is labeled "Cumulative Percentage of Contributed Cost Value." This means that the percentage appearing consists of the sum of all the percentages of total cost value per service preceding and including the service in question. For example, if service number 2d is selected, the cumulative percentage of contributed cost value appearing in that line corresponds to the sum of the per cent of total cost value for services number 2, 2e, and 2d (namely; 57.94 per cent plus 21.49 per cent plus 7.37 per cent, or simply a cumulative total of 86.80 per cent).

Figure 2 and Figure 3 represent data from Table 3. Figure 2 depicts the percentage contributed by each service in descending order of contributed cost value; while Figure 3 shows the cumulative percentage of contributed cost value for the services rearranged in the order shown in Table 3. These figures (Figure 2 and Figure 3) help suggest the ranking of the services into the A, B, and C groups.

Table 4 represents the services separated into three ranks. It also notes the percentage of the services which fall within each rank, and the percentage of contributed cost value under each rank. All 23 services are included in this table.

Table 5 is essentially the same as Table 4, except for the fact that those services (2a, 2b, 3a, 3b, 3c, 5a, 6, and 7a), which contributed no cost value at all, are deleted. Therefore, under the column

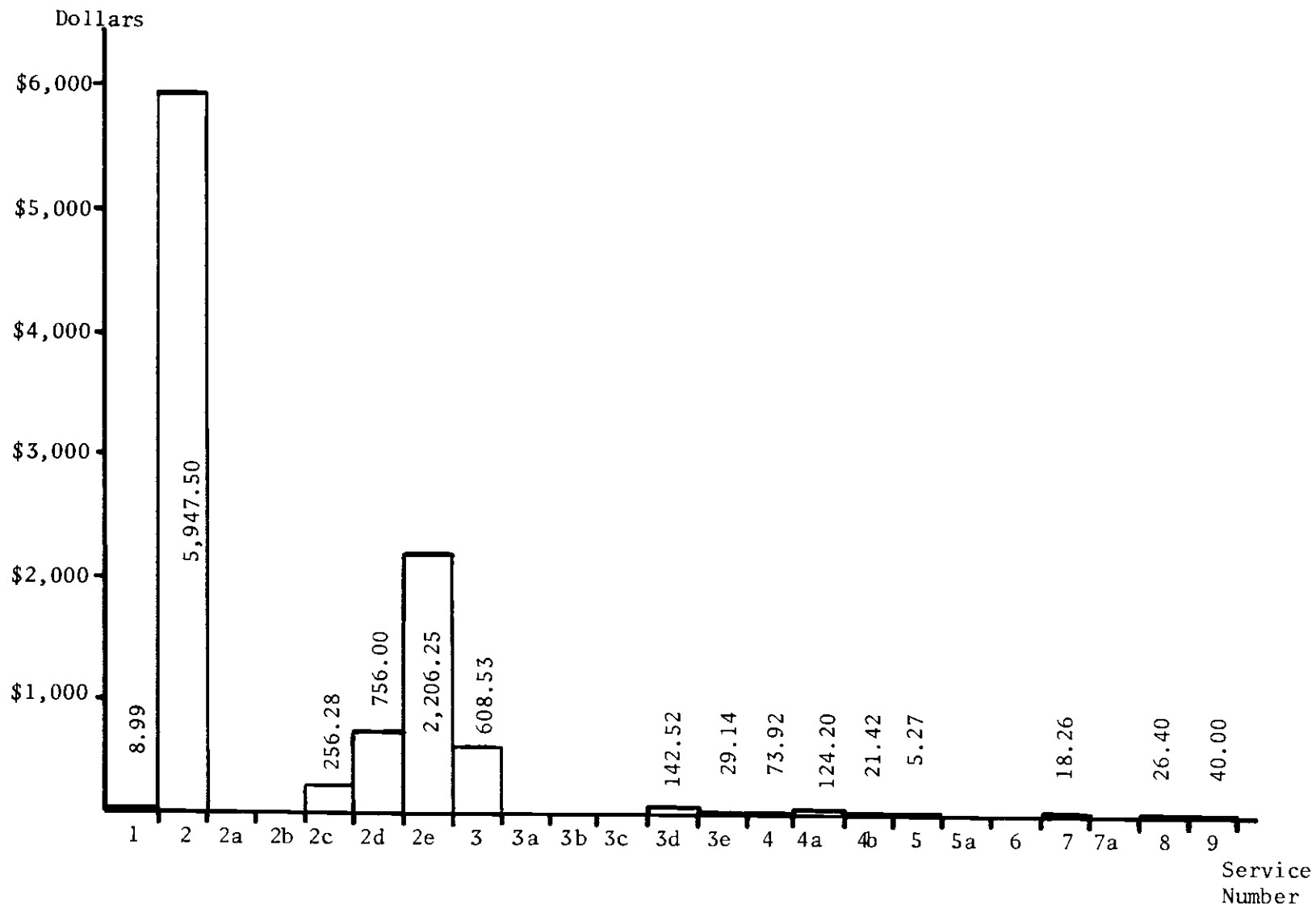


Figure 1. Cost of each Service from the Pharmacy Department for the period of December 1967, to March 1968.

Table 3. Rearrangement of Cost Data in Descending Order of Cost Value

Service Number	Total Cost Value	Per Cent of Total Cost Value	Cumulative Percentage of Contributed Cost Value
2	5,947.50	57.94%	57.94%
2e	2,206.25	21.49%	79.43%
2d	756.00	7.37%	86.80%
3	608.53	5.93%	92.73%
2c	256.28	2.50%	95.23%
3d	142.52	1.39%	96.62%
4a	124.20	1.21%	97.83%
4	73.92	.72%	98.55%
9	40.00	.39%	98.94%
3e	29.14	.28%	99.22%
8	26.40	.26%	99.48%
4b	21.42	.20%	99.68%
7	18.26	.18%	99.86%
1	8.99	.09%	99.95%
5	5.27	.05%	100.00%
2a	-----	-----	-----
2b	-----	-----	-----
3a	-----	-----	-----
3b	-----	-----	-----
3c	-----	-----	-----
5a	-----	-----	-----
6	-----	-----	-----
7a	-----	-----	-----

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23 Services \$10,264.68

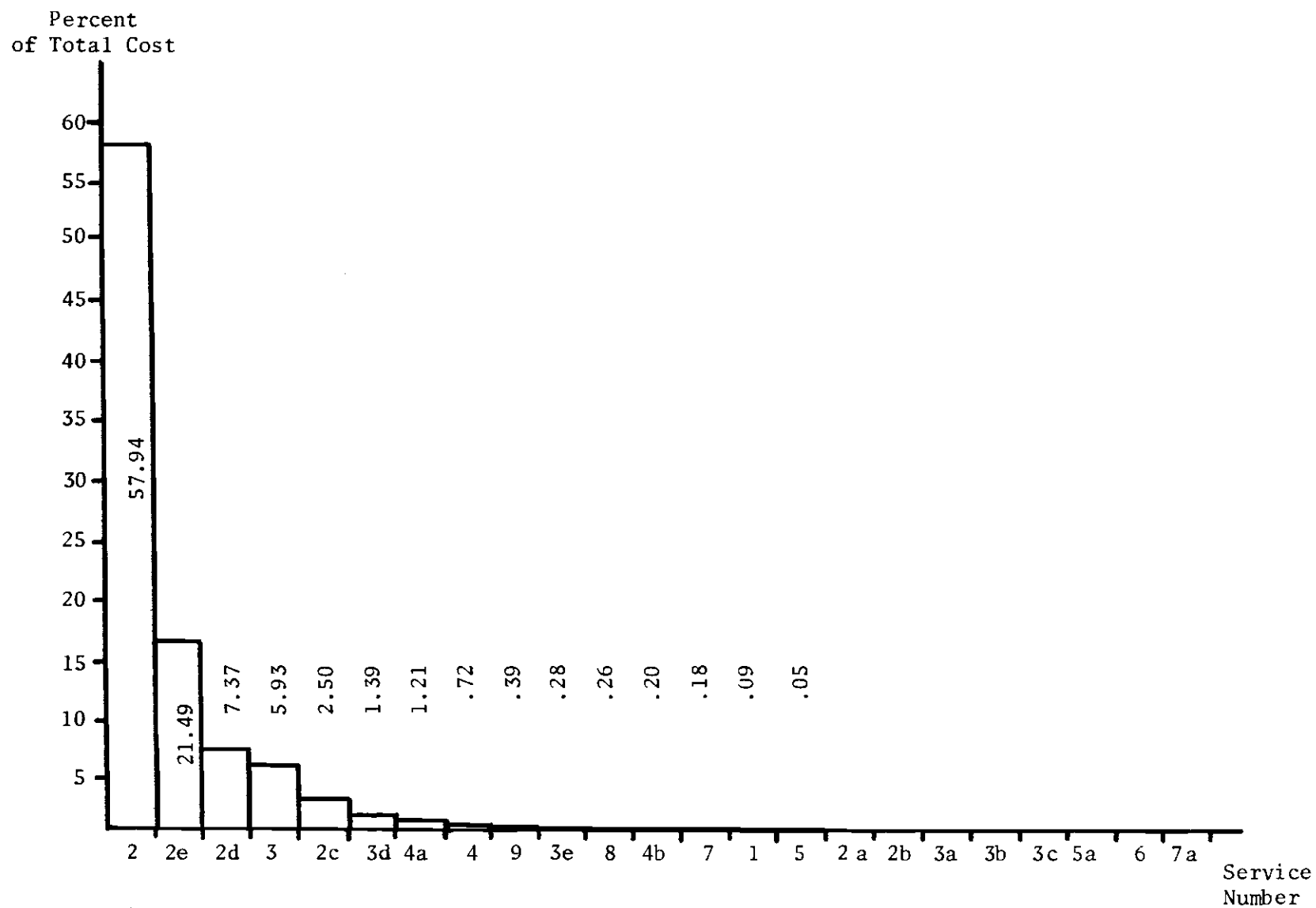


Figure 2. Percentage Contributed by each Service in Descending Order of Contributed Cost Value.

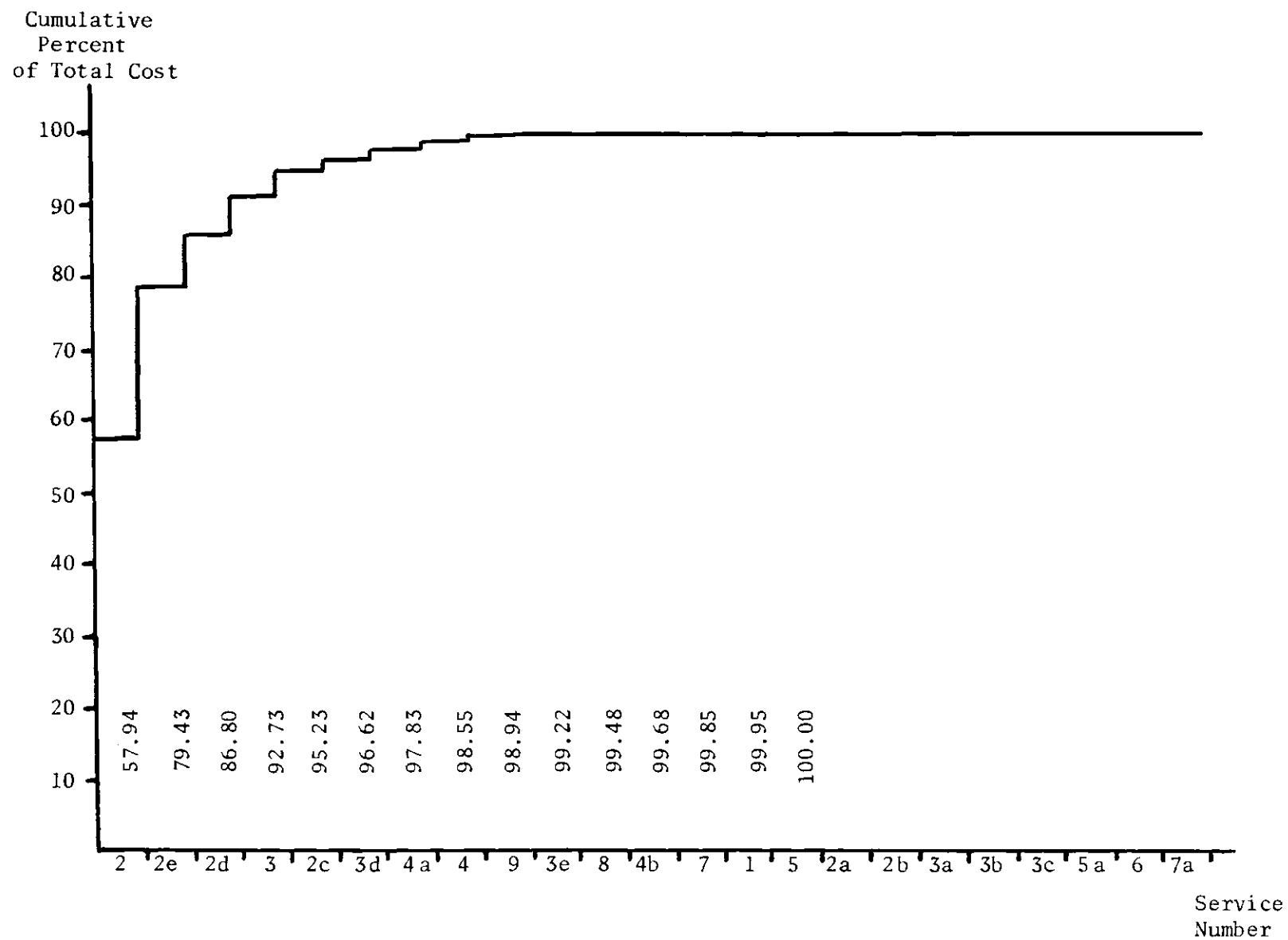


Figure 3. Cumulative Percentage of Contributed Cost Value for the Services Arranged in Descending Order of Contributed Cost Value.

labeled "Per Cent Quantity of Services" the per cent amounts are different from those under the same column of Table 4.

The results of these two tables are strikingly similar to what Pareto had predicted would occur under a situation where a sufficient number of items exist.

#### Application of Opportunity Cost Concept

The concept of opportunity cost was discussed in Chapter II. It was concluded that this concept had the following interpretations:

- (1) Revenue is foregone if capital is not used in its most profitable alternative.
- (2) The efficiency in a job is foregone if the scarce and time limited (assumption (2), Chapter I) managerial abilities are not being used to their potential

It is the author's intention to apply the second of these interpretations to the research.

A manager, who wants to utilize his abilities more efficiently, must consider how to allocate his time to the most important activities. Since the application of his knowledge consumes time, and since time is a scarcity to managers in particular (assumption (3), Chapter I), he must optimize the use of it. A starting point in the optimizing of his resources, consists in the identification of those areas in which he should spend his time. In the Pharmacy Department, the manager's main concern is with the different services offered, for instance, the dispensing of drugs to patients (see Table 1, Chapter III). Hence, the concept of opportunity cost can be utilized to help the managers in the process of allo-

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Table 4. Ranking of All Services into the A, B, and C Groups

Rank	Service Number	Per Cent Quantity of Services	Per Cent of Contributed Cost Value
<u>A</u>	2, 2e	8.70%	79.4%
<u>B</u>	2d, 3, 2c	13.05%	16.8%
<u>C</u>	3d, 4a, 4, 9, 3e, 8, 4b, 7, 1, 5, 2a, 2b, 3a, 3b, 3c, 5a, 6, 7a	78.25%	4.8%

Table 5. Ranking of those Services which Contributed some Cost Value into the A, B, and C Groups

Rank	Service Number	Per Cent Quantity of Services	Per Cent of Contributed Cost Value
<u>A</u>	2, 2e	13.33%	79.4%
<u>B</u>	2d, 3, 2c	20.00%	16.8%
<u>C</u>	3d, 4a, 4, 9, 3e, 8, 4b, 7, 1, 5	66.67%	4.8%

cating (decision making) their time more productively.

It was noted that the Pharmacy Department offers 23 different services (see Table 1, Chapter III). If the pharmacy manager does not have any cost information available, he must guess how much time to dedicate to the process of managing the different services. Therefore, a need exists for managerial accounting procedures by which a manager can simplify his decision making and reduce the risk incurred by using intuition. After managerial accounting procedures are introduced, the hospital department manager can use the cost information produced to help him evaluate different alternatives of time allocation through the concept of opportunity cost. This concept will enable him to rank the services as A items, B items, and C items.

Under certain circumstances a manager will get directly involved in routine decisions or in problems that are below his assigned level of activity, and thus reduce his productivity and efficiency. One such condition may occur during moments of strain, at which time he may fall back upon the familiar. In similar conditions of tension, subordinates may attempt to convince the manager to assume their responsibilities. Therefore, a manager needs to realize the "opportunities" he is foregoing whenever he spends time in an activity which is below his assigned level of activity.

To illustrate "being aware of the opportunities he is foregoing," suppose a service department manager neglects a C item. The value lost is very small. On the other hand, suppose he neglects an A item. The value lost is considerable. Any competent manager always has more to do than he has time in which to perform his duties (assumption (3), Chap-

ter I); therefore, by calculating in advance to either neglect or delegate the least important items, he can free his time to work on the A items. This is the essence of the second interpretation of the opportunity cost concept. More specific, a manager by concentrating on the A items, by paying only slight consideration to the B items, and by neglecting or delegating the C items, can improve his productivity, and hence his efficiency.

It is very hard to express the improvement of his efficiency in the job in monetary terms. If this could be done, the first interpretation of opportunity cost could be applied here. However, it is discernible that there is a monetary improvement, although difficult to measure. Nevertheless, the second interpretation of opportunity cost permits the application of this concept to the case of the hospital service manager.

In the particular case of the Pharmacy Department at the Holy Family Hospital, it is seen that (see Table 4, and Table 5) there are two services (service number 2 and 2e) under the A rank. These two services comprise 8.70 per cent of all 23 services identified and 13.33 per cent of all 15 services which contributed some cost value during the four month period. This small percentage of services has associated to it a 79.4 per cent of the contributed cost value. If there are problems or decisions related to these two services to be solved or taken, the pharmacy manager should concentrate all his time and abilities on these. Otherwise he is foregoing the opportunity of using his resources in the areas where the greatest need for them exists.

Under the B rank, there are three services (service number 2d, 3, and 2c). These services represent 13.05 per cent or 20.00 per cent of

the 23 services offered or of the 15 services which contributed some cost value respectively. The percentage of contributed cost value for these services was of 16.8 per cent. Group G services should be considered whenever there is additional time available after considering the services in group A. If groups A and B are joined, it is noticed that between them they have contributed over 96 per cent of all the cost value for services. This fact is very important, if it is pondered that only 21.75 per cent or 33.33 per cent of all services considered (depending if one takes 23 or 15 services as the total) account for almost all (96.2 per cent) the cost value. It is clear that a manager uses his time more productively if he concentrates his abilities in this small area.

Those services falling under rank C, should be either neglected or delegated since they do not contribute over 4 per cent of the total cost value. However, caution should be exercised before neglecting any service in a hospital department. Many of the services are needed even if they do not contribute to the overall operation, because of the nature of the hospital industry. Hospital operations call for the services even if they are not used or do not represent a profitable operation. However, what has been developed here fits into this environment, if the objectives of this paper are reviewed. Essentially, they are concerned with helping the department manager in his decision making process (make him realize where to utilize his scarce resources more productively) so as to improve his efficiency. It should be noticed that it is not a procedure to follow, but a tool to utilize in his decision making process. This fact recognizes that other factors can influence his final decision; however, it helps the service department manager when the circumstances permit it.

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

#### Conclusions

The conclusions that may be drawn from the application of the concept of opportunity cost to a hospital service department are:

- (1) The application of the opportunity cost concept to the data available, helps the decision maker recognize those areas in which a "greater return" is possible, given the limited ability and time of the hospital department manager.
- (2) This application helps the hospital manager realize that his resources (abilities) are limited by time. Thus it forces him to concentrate in the more productive areas (services) under his management.
- (3) This application makes the hospital manager aware that there are other factors which influence his decisions. Thus it promotes the search for these by the hospital manager, and it makes this application flexible enough to fit into the hospital environment.
- (4) This application of opportunity cost concept is a tool to help the hospital department manager make decisions based on certain economic considerations.
- (5) The analysis of the cost data indicates that Pareto's law is applicable to other service departments in the hospital, where

there are a sufficient number of services offered.

- (6) The use of Pareto's law in other departments in the hospital calls for the application of the opportunity cost concept to these departments.
- (7) This thesis demonstrates the need for managerial accounting practices, by which cost information is gathered for the benefit of the hospital manager.

#### Recommendations

There are several recommendations relating to this investigation which demand further research in the general area of managerial accounting applications. In accordance with the scope, limitations, and conclusions of this investigation, the following recommendations are offered:

- (1) The application of the opportunity cost concept to the other departments of the Holy Family Hospital.
- (2) The collection of pertinent cost information by other hospital departments, to make possible the application of managerial accounting concepts.
- (3) The suggestion that research be conducted to identify other factors which should be considered by a hospital department manager when making a decision.
- (4) The suggestion that more detailed, and more frequent records should be kept for those services which are ranked under the A group for each service department in the hospital.
- (5) The suggestion that a deemphasizing of the cost data collection of those services under the C rank should be implemented in each service department at the hospital.

## APPENDIX A

## SERVICE PRICING WORKSHEET - NFH 67

(name of service)

(producing department)

(date)

(person(s) preparing this worksheet)

## ESTIMATED LABOR COST

[illegible]

10

## ESTIMATED BURDEN COST

Calculated

or Direct Labor Cost \$ X 0.25 =

ral

## ESTIMATED SUPPLIES COST

Supply item	Amount	Cost
-------------	--------	------

51

PRICE PER UNIT OF REGULAR SERVICE

201

SPECIAL OR EMERGENCY ASPECTS OF SERVICE



## APPENDIX B

MONTH OF December, 1967

No. of Serv.	No. of Occurrences	Charge/Occurrence	Total Cost of Service
1	-----	\$0.31/request	-----
2	3,359	\$0.25/order	\$ 839.75
a	-----	\$0.13/order	-----
b	-----	\$0.30/order	-----
c	126	\$0.43/order	\$ 54.18
d	724	\$0.36/trip	\$ 260.64
e	184	\$6.25/order	\$1,150.00
3	399	\$0.31/order	\$ 123.69
a	-----	\$0.11/order	-----
b	-----	\$0.35/order	-----
c	-----	\$0.38/order	-----
d	43	\$0.36/trip	\$ 15.48
e	13	\$0.31/order	\$ 4.03
4	155	\$0.16/order	\$ 24.80
a	117	\$0.27/order	\$ 31.59
b	5	\$0.42/order	\$ 2.10
5	2	\$0.31/order	\$ 0.62
a	-----	\$0.31/order	-----
6	-----	\$11.50/hour	-----
7	5	\$1.66/order	\$ 8.30
a	-----	\$1.60/order	-----
8	1	\$6.60/report	\$ 6.60
9 Other	1	Open	\$ 40.00

MONTH OF January, 1968

No. of Serv.	No. of Occurrences	Charge/Occurrence	Total Cost of Service
1	15	\$0.31/request	\$ 4.65
2	6,765	\$0.25/order	\$1,691.25
a	-----	\$0.13/order	-----
b	-----	\$0.30/order	-----
c	161	\$0.43/order	\$ 69.23
d	319	\$0.36/trip	\$ 114.84
e	7	\$6.25/order	\$ 43.75
3	536	\$0.31/order	\$ 166.16
a	-----	\$0.11/order	-----
b	-----	\$0.35/order	-----
c	-----	\$0.38/order	-----
d	120	\$0.36/trip	\$ 43.20
e	40	\$0.31/order	\$ 12.40
4	18	\$0.16/order	\$ 2.88
a	129	\$0.27/order	\$ 34.83
b	1	\$0.42/order	\$ 0.42
5	2	\$0.31/order	\$ 0.62
a	-----	\$0.31/order	-----
6	-----	\$11.50/hour	-----
7	3	\$1.66/order	\$ 4.98
a	-----	\$1.60/order	-----
8	1	\$6.60/report	\$ 6.60

MONTH OF February, 1968

No. of Serv.	No. of Occurrences	Charge/Occurrence	Total Cost of Service
1	8	\$0.31/request	\$ 2.48
2	6,757	\$0.25/order	\$1,689.25
a	-----	\$0.13/order	-----
b	-----	\$0.30/order	-----
c	181	\$0.43/order	\$ 77.83
d	468	\$0.36/trip	\$ 168.48
e	105	\$6.25/order	\$ 656.25
3	468	\$0.31/order	\$ 145.08
a	-----	\$0.11/order	-----
b	-----	\$0.35/order	-----
c	-----	\$0.38/order	-----
d	117	\$0.36/trip	\$ 42.12
e	18	\$0.31/order	\$ 5.58
4	139	\$0.16/order	\$ 22.24
a	100	\$0.27/order	\$ 27.00
b	9	\$0.42/order	\$ 3.78
5	9	\$0.31/order	\$ 2.79
a	-----	\$0.31/order	-----
6	-----	\$11.50/hour	-----
7	-----	\$1.66/order	-----
a	-----	\$1.60/order	-----
8	1	\$6.60/report	\$ 6.60

MONTH OF March, 1968

No. of Serv.	No. of Occurrences	Charge/Occurrence	Total Cost of Service
1	6	\$0.31/request	\$ 1.86
2	6,909	\$0.25/order	\$1,727.25
a	-----	\$0.13/order	-----
b	-----	\$0.30/order	-----
c	128	\$0.43/order	\$ 55.04
d	589	\$0.36/trip	\$ 212.04
e	57	\$6.25/order	\$ 365.25
3	560	\$0.31/order	\$ 173.60
a	-----	\$0.11/order	-----
b	-----	\$0.35/order	-----
c	-----	\$0.38/order	-----
d	127	\$0.36/trip	\$ 45.72
e	23	\$0.31/order	\$ 7.13
4	150	\$0.16/order	\$ 24.00
a	114	\$0.27/order	\$ 30.78
b	36	\$0.42/order	\$ 15.12
5	4	\$0.31/order	\$ 1.24
a	-----	\$0.31/order	-----
6	-----	\$11.50/hour	-----
7	3	\$1.66/order	\$ 4.98
a	-----	\$1.60/order	-----
8	1	\$6.60/report	\$ 6.60

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